Downstream Fry Enumeration of the 1985 Brood Sockeye and Chinook Escapement to the Horsefly River

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DOWNSTREAM FRY ENUMERATION OF THE 1985 BROOD SOCKEYE AND CHINOOK ESCAPEMENT TO THE HORSEFLY RIVER

by

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ABSTRACT

Mueller, C. and R. Kent. 1988. Downstream fry enumeration of the 1985 brood sockeye and chinook escapement to the Horsefly River. Can. MS Rep. Fish. Aquat. Sci. 1980: 38 p.

Sockeye fry (1985 brood year) were enumerated during their downstream migration in the Horsefly River. Fry were trapped from three sites along the river to estimate fry emergence from three river areas; an experimental transplant area above the impassable Horsefly Falls, a traditional spawning area below the falls, and another traditional spawning area in the lower end of the river. The project took place from early April 1986 until early July 1986. Total survival from the Horsefly River was estimated to be 4.4%. The higher survival rates estimated from the transplant area (8.8%) and the lower area (11.8%) were offset by low survival from the heavily spawned area below the falls (1.9%). Survival was greatly influenced by severe cold and low precipitation in the late fall of 1985. The peak emergence in the traditional spawning areas occurred on May 20, 1986. Emergence from the transplant area occurred a month later. We calculated that 97.8% of downstream fry migration took place at night.

RÉSUMÉ

Mueller, C. and R. Kent. 1988. Downstream fry enumeration of the 1985 brood sockeye and chinook escapement to the Horsefly River. Can. MS Rep. Fish. Aquat. Sci. 1980: 38 p.

On a dénombré les alevins de saumon rouge (nés en 1985) au cours de la dévalaison dans la rivière Horsefly. Afin de déterminer le taux d'émergence on les a capturé à la trappe à trois endroits du cours d'eau; une zone de déversement expérimental située en amont des chutes Horsefly infranchissables, une frayère traditionnelle en aval des chutes et une autre frayère traditionnelle dans la partie inférieure de la rivière. L'étude a eu lieu du début d'avril jusqu'au début juillet 1986. On a déterminé que le taux de survie total dans la rivière Horsefly s'élevait à 4,4%. Les taux élevés obtenus pour la zone de déversement (8,8%) et la frayère de la partie inférieure de la rivière (11,8%) ont été contrebalancés par le faible taux de survie notés dans la frayère en aval des chutes (1,9%). Le froid intense et le faible taux de précipitation observés vers la fin de l'automne de 1985 ont fortement influé sur le taux de survie. Dans les frayères traditionelles, l'émergence a atteint son maximum le 20 mai 1986 tandis que dans la zone de déversement, elle a eu lieu un mois plus tard. On a déterminé que 97,8% de la dévalaison a lieu la nuit.

INTRODUCTION

A downstream fry enumeration of 1985 brood sockeye (*Oncorhynchus nerka*) and chinook (*Oncorhynchus tshawytscha*) salmon in the Horsefly River was carried out by Department of Fisheries and Oceans (DFO) staff from early April to late June 1986. The Horsefly River is the major spawning tributary of the Quesnel Lake system (52° N, 121° W) which is a major sockeye salmon spawning area in the Fraser River watershed (Fig. 1). The largest escapement (1,135,000 adults) to the Quesnel Lake system since 1913 was recorded during the fall of 1985 (Farwell 1987). The project was conducted to determine sockeye salmon fry survival from egg deposition to emergence and to support sockeye fry population studies in Quesnel Lake.

DFO also investigated the feasibility of increasing the available spawning grounds by airlifting 31,512 adult sockeye above the Horsefly River Falls (Fig. 2). The falls are impassable but there are numerous potential spawning sites in the transplant area and a survival estimate was required to determine whether the sockeye had successfully utilized the gravel. Results obtained from the study will be used to determine if future transplants would be conducted when escapement exceeded the optimum for the upper and lower areas.

METHODS

TRAP SITES AND EQUIPMENT

Three trapping sites were selected to provide survival estimates from the three spawning areas (Fig. 2). Site A was located approximately 1.5 km above the Horsefly River falls and approximately .75 km below the transplant spawning area. The site was easily accessible from the main road and within walking distance for personnel tending the traps. Traps were hung from a steel cable strung from shore to shore and fry captured yielded an emergence estimate for the transplant area (Fig 2).

Site B was located below the upper spawning area and easy access from the main road was also available. Bridge pilings were used to anchor the traps. Emergence from the upper area was calculated by subtracting emergence estimates from Site A from Site B estimates (Fig 2).

Site C was located at the river mouth and was below all spawning areas. Emergence estimates from the entire river and from the lower spawning area were obtained by subtracting Site B estimates from Site C estimates. These traps were held in place by anchoring them to the river bed. The site was only accessible by boat.

Two .6 m x .9 m x 2.75 m inclined plane floating traps were installed at each trap site (Fig. 3). Traps were situated in the river's main flow and floats on the traps were adjusted to allow a 6 mm spigot of water to flow over the top of the incline into the trap box. As fry were swept up the incline the water accelerated and the fry were unable to retreat. Fry were removed using dipnets, transported in live boxes, and counted.

FISHING TIMES AND DATES

A fyke net was operated from dusk to dawn from April 1 until April 11 at the Horsefly River bridge to determine the time of first emergence (Fig 2).

Traps were fished from dusk to dawn during the following periods; Site A - April 18 to June 27, Site B - April 19 to June 18, and Site C - April 18 to June 17. All trap sites were fished from dawn to dusk once weekly beginning April 30. High water and/or debris made it impossible to fish the traps during the nights of May 12, 27, 28 at Site A, May 12, 27, 29 at Site B and May 12 and 21 at Site C.

METHOD OF ESTIMATION

The daily emergence estimate was determined using the Peterson mark-recapture method (Ricker 1975) on those days on which marked fry were released. An estimate of the whole population was not possible using the simple Peterson mark recapture method because marked fish not recaptured were lost to the lake.

Captured fry were kept in holding tanks until there were enough for a release. Fry were marked using a Bismark-Brown dye solution of 1 g of dye to 61 L of water at 6°C. Marks were released approximately 1.5 km above the target trap site just after dark to facilitate their dispersal among that evening's migration. The three trap sites made it necessary to time releases such that upstream marks did not interfere with downstream trap catches. This was accomplished by staggering releases over two days to allow for the marks to clear the system.

On nights when the total trap catch was too large to count, the catch was weighed and then divided by the mean number of fish determined from a counted subsample. The proportion of sockeye and chinook in the subsample was also determined and used to estimate the total catch by species. Miscellaneous fish, counted while debris was being separated from the catch, were added to these figures to provide a final catch by species for each trap (Appendix I).

On days when daylight catches were made the proportion of the total catch caught at night in both traps was estimated. On other days this proportion was linearly interpolated between measured estimates (Appendix II, Tables I & II).

Recovery rates were determined from mark-recapture ratios on the night of release. On nights when no release was made linear interpolations between releases were used to calculate the recovery rate (Appendix II).

The final estimate of emergence at each site was determined by dividing the total night catch by the recovery rate to give the estimated night emergence. This was then divided by the proportion caught at night to give the total 24 hour estimated emergence (Appendix II).

The night and 24 hour emergence estimates were interpolated when there was migration but the traps were not fished. These estimates were interpolated from trap installation back to first fyke net catch for both Site B and Site C. Interpolated estimates were made on the dates that the traps were taken out by high water and/or debris. Interpolated estimates were also made on June 28 to June 30 at Site A, June 19 to July 2 at Site B, and June 18 to July 4 at Site C (Appendix II).

The transplant area egg to fry survival estimate was determined directly from data attained from Site A. Upper area egg to fry survival estimate was determined by subtracting the Site A estimate from the Site B estimate. Lower area egg to fry survival estimate was determined by subtracting the Site B estimate from the Site C estimate. The Site C estimate is considered the Horsefly River estimate.

RESULTS and DISCUSSION

EMERGENCE TIMING

Fyke net data indicated that emergence from the upper and lower areas began April 9. This was one week later than anticipated probably due to fewer than normal water thermal units indicated by the abnormally cold weather in November, 1985 (Table 1). Emergence was first recorded from the transplant area April 23 as the adults used were late spawners transplanted at the end of the run.

Daily emergence from the upper area and the river peaked on May 20 with 1,608,000 fry emerging from the upper area and 9,276,000 in total from the river (Fig. 5 and 6) (Appendix II, Table II and III). Peak daily emergence in the transplant area occurred on June 15 when 374,000 fry emerged (Fig 4) (Appendix II, Table I).

There was no daytime emergence from the transplant area. There was daytime emergence from the upper and lower areas but significantly more fish emerged at night (97.8%) than during the day (t-Test, $t=25.98$, $P<.001$) (Table 2).

There was an indication that increased water levels corresponded to increased emergence (Fig 7.). However, increased emergence both preceded and followed increased flows and thus the change in flow cannot be directly related to emergence. Both may be responding to increased temperature which would cause more snow melt run off and provide increased thermal units for more rapid development of fry to the emergent stage.

The traps were occasionally not fished becaused of very high flows. On these nights we interpolated between the night before and after when the traps were fished to provide estimates for the unfished nights. As there is a relationship between flow and emergence we may be underestimating the true catch, but we do not have enough information to provide a better estimate.

SURVIVAL

Overall sockeye fry survival from the Horsefly River was 4.4% (Table 3). Survival from the transplant and lower areas were 8.8% and 11.8% respectively but the 1.9% survival in the upper area reduced the overall average considerably. Transplant area survival was encouraging and we believe another transplant involving a greater number of adults would be successful. The main channel in the transplant area is relatively deep and was not as greatly affected by the environmental conditions that affected the upper area. Also, the success of the transplant shows that it is possible to relieve spawning pressure on the upper area if necessary.

The upper area takes in three separate spawning locations. These are the Horsefly River upper area with 731,000 spawners, McKinley Creek with 83,000 spawners and the Upper McKinley with 15,000 spawners (Fig. 2). Although the egg deposition is determined from total effective females[a] in these locations further study would be required to determine whether the Upper McKinley spawners migrate to Quesnel Lake or remain resident in McKinley Lake. As there were only 8,700 effective females in the Upper McKinley the effect on upper area survival would be insignificant.

The poor survival from the upper area was due mainly to abnormal weather conditions in November, 1985 and in some degree to high water during migration in the spring of 1986. While spawning was underway during September and October 1985 environmental conditions were normal but in November extreme cold and low precipitation resulted in a low river discharge (Table 1). The upper area is a flood plain and the main channel is wide and shallow. Redds located near the shores were first uncovered by the receding water and then any eggs that had little or no water over them were frozen in the gravel. Spring flooding possibly affected the survival estimate in the upper area because flood water overflowed the banks and carried emergent fry into the surrounding fields. Further study would be required to determine if sufficient numbers were trapped in the fields to have a significant effect on fry survival.

[a] Effective females are the total females multiplied by the weighted mean of the percentage that successfully spawned.

Survival for the lower area is calculated from escapements to the Horsefly River lower area and the Little Horsefly River (Fig. 2). A deeper main channel combined with the influx of warmer water from Horsefly Lake via the Little Horsefly River somewhat protected the lower area spawning grounds from the factors that affected upper area survival. In future dominant brood years with an escapement equivalent to 1985, a fence keeping a greater number of spawners in the lower area could enhance overall survival.

It was possible to determine chinook emergence, but not chinook survival, as there is no spawning or fecundity data for the brood year chinook. Chinook fry survival was not as greatly influenced by the same factors that affected sockeye fry survival. Chinook adults arrive and begin spawning prior to the arrival of the adult sockeye. The majority of chinook spawn in the upper area but by having first choice were able to utilize the deeper water in center of the channel and somewhat avoid the environmental factors that affected the upper area sockeye survival. Thus, using the same recovery rates and percentage of night migration for the chinook as for the sockeye it was calculated that 149,000 chinook fry emerged from the upper area and 127,000 chinook fry from the lower area, leaving 22,000 fry resident in the river (Appendix II, Table II and III).

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We wish to acknowledge the efforts of the following people involved in the field project; O. Brockwell for organization and supervision, K. Peters, B. Englund, R. Bemister, L. Giesbrecht, B. McNeil for working night and day to collect the data, T. G. Brown, J. M. B. Hume and V. E. Ogilvie for assistance in analysis and editing of the report, and Itsuo Yesaki for drafting the maps.

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Table 1 - Seasonal and specific environmental conditions for sample area during fall and winter months.

MONTH	AIR TEMP (°C)[1]		PRECIPITATION (mm)[1]		DISCHARGE (m^3/s)	
	1951-80[2] Mean	1985-86 Mean	1951-80[2] Mean	1985-86 Mean	1955-84 Mean[3]	1985-86 Mean[4]
Sep	10.4	8.3	50.4	129.9	13.8	10.3
Oct	5.6	4.2	61.6	131.0	12.5	12.5
Nov	-1.1	-12.4	58.4	18.1	9.2	5.5
Dec	-5.9	-5.8	83.0	42.5	5.3	2.6
Jan	-10.0	-2.2	74.2		4.5	2.8
Feb	-4.5	-7.1	60.2	20.9		

1. Atmospheric Environment Service, Climate Information, 1200 W. 73rd Ave., Vancouver, B.C.
2. Means are based on 20 years of collected data adjusted over 30 years.
3. Environment Canada. 1985.
4. Environment Canada. 1986.

Table 2 - Comparison of day and night fry catches for the sum of sockeye and chinook from the Site B and Site C traps.

DATE	NIGHT (n)	DAY (n)	NIGHT MIGRATION (%)
Apr 30	15,200	140	99.09
May 7	51,700	540	98.96
May 14	34,900	1,240	96.58
May 22	27,200	660	97.63
May 31	14,600	500	96.66
Jun 3	12,900	190	98.53
Jun 11	4,100	290	93.50
Total	160,600	3,560	97.80

Table 3 - Summary of emergence estimates and survival from the three study areas.

AREA	EGG DEPOSITION	ESTIMATED EMERGENCE	95% CONFIDENCE	% SURVIVAL
TRANSPLANT	56,254,000	4,934,000	3.3%	8.8%
UPPER	1,337,903,000	25,899,000	5.9%	1.9%
LOWER	424,032,000	49,907,000	6.0%	11.8%
TOTAL	1,818,189,000	80,740,000	3.4%	4.4%

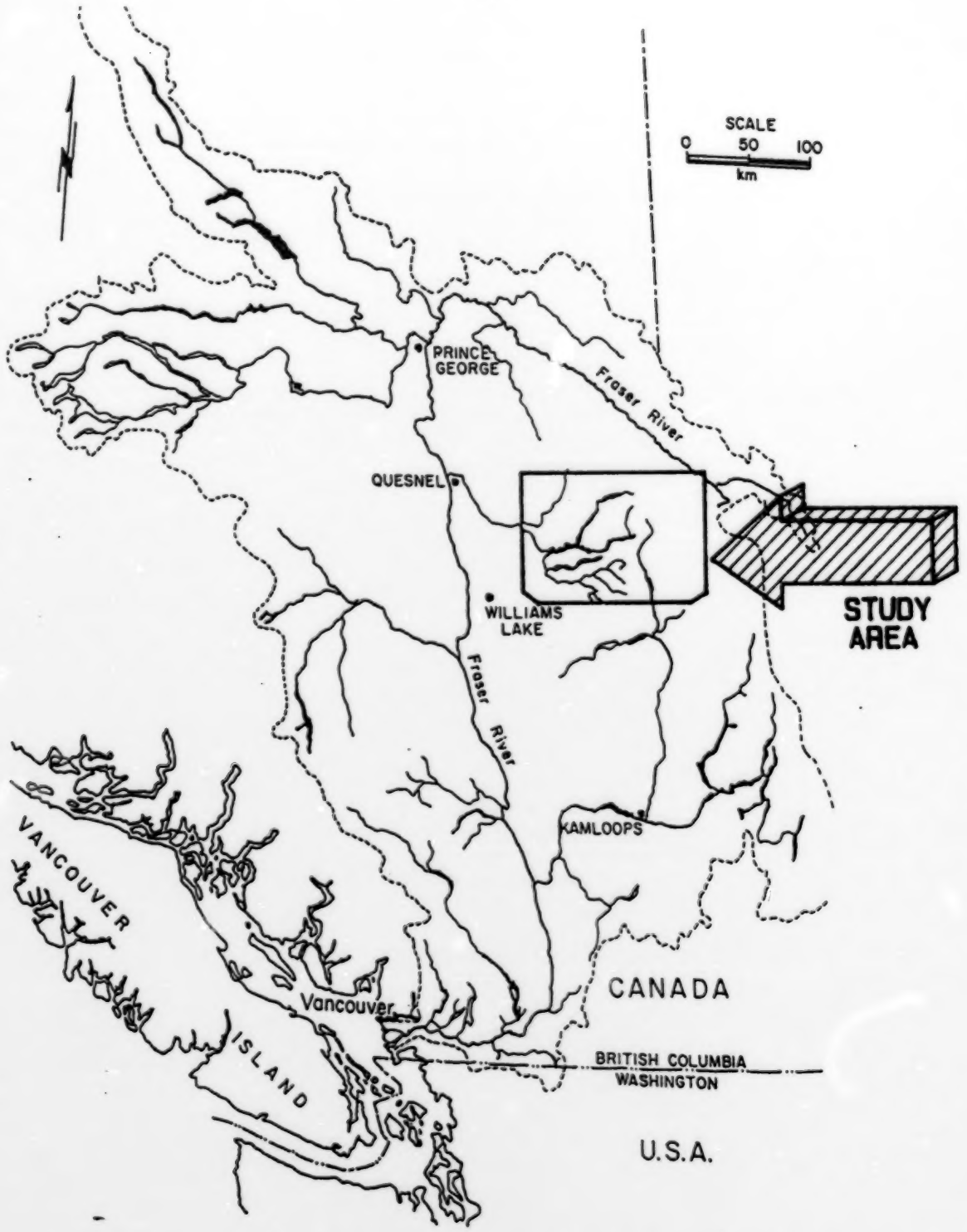

Fig. 1. Map of the Fraser River drainage basin indicating the study area.

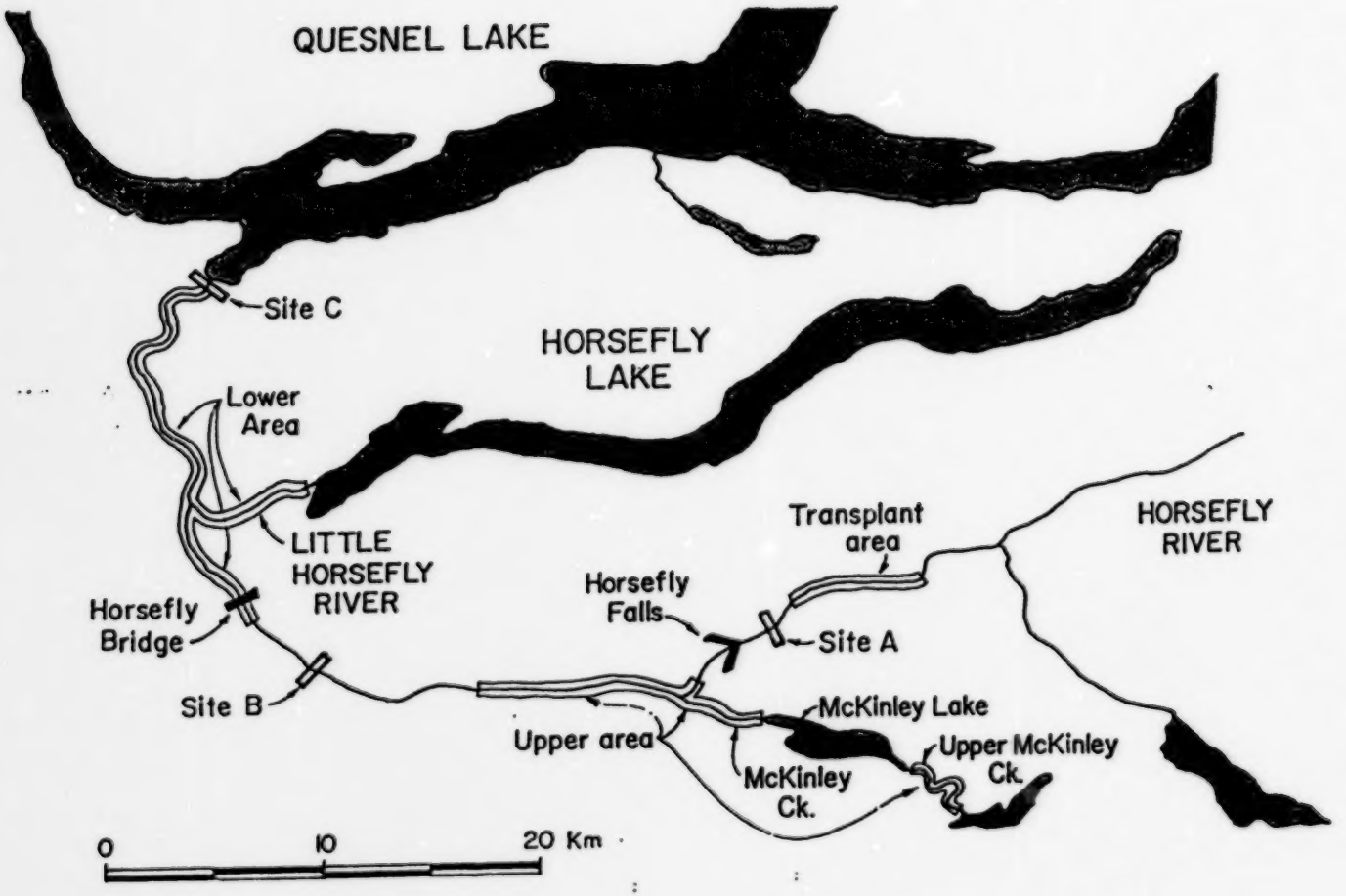

Fig. 2. Map showing the approximate locations of trap sites and spawning areas on the Horsefly River.

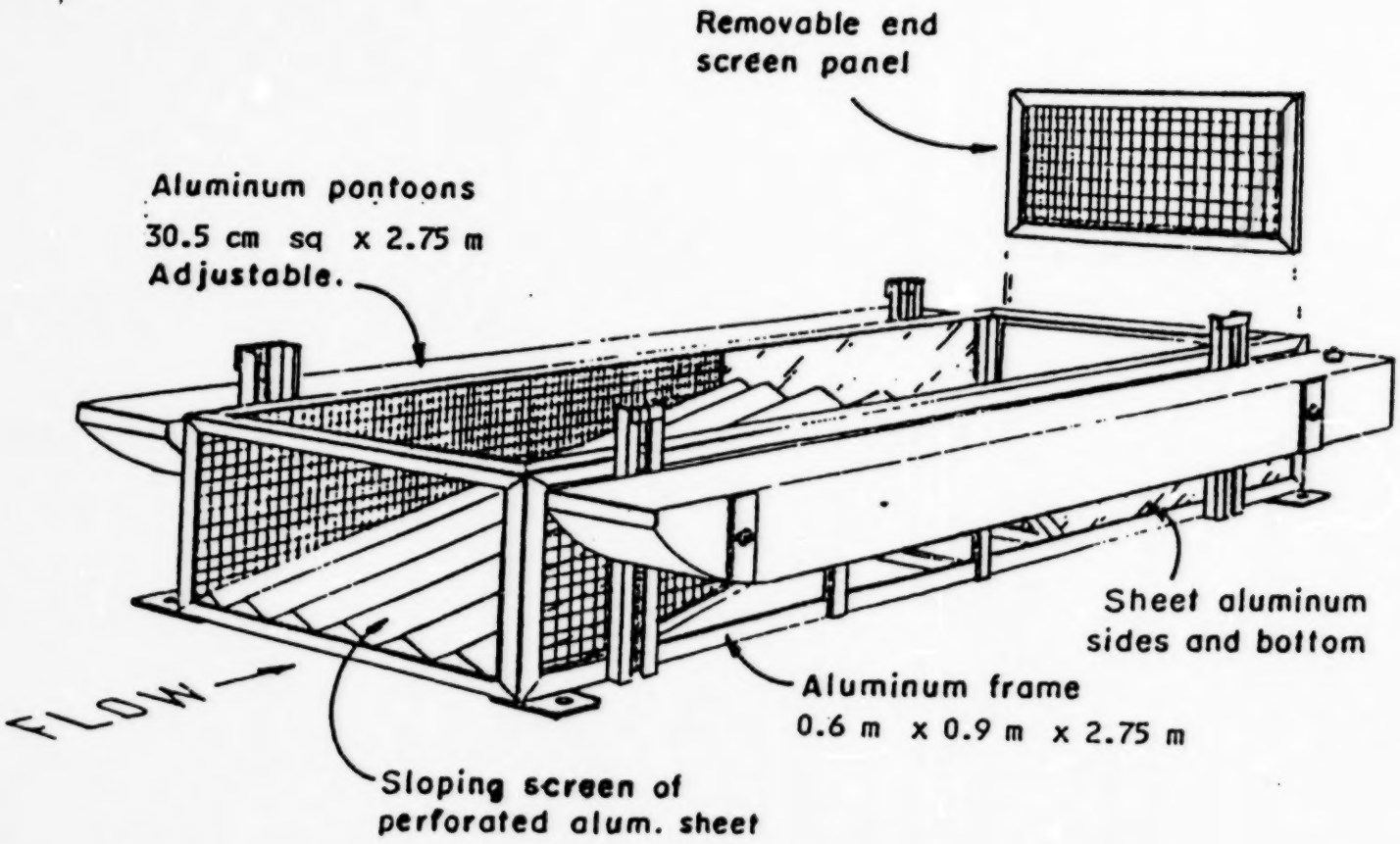

Fig. 3. International Pacific Salmon Fisheries Commission drawing #53–55 showing inclined plane floating trap.

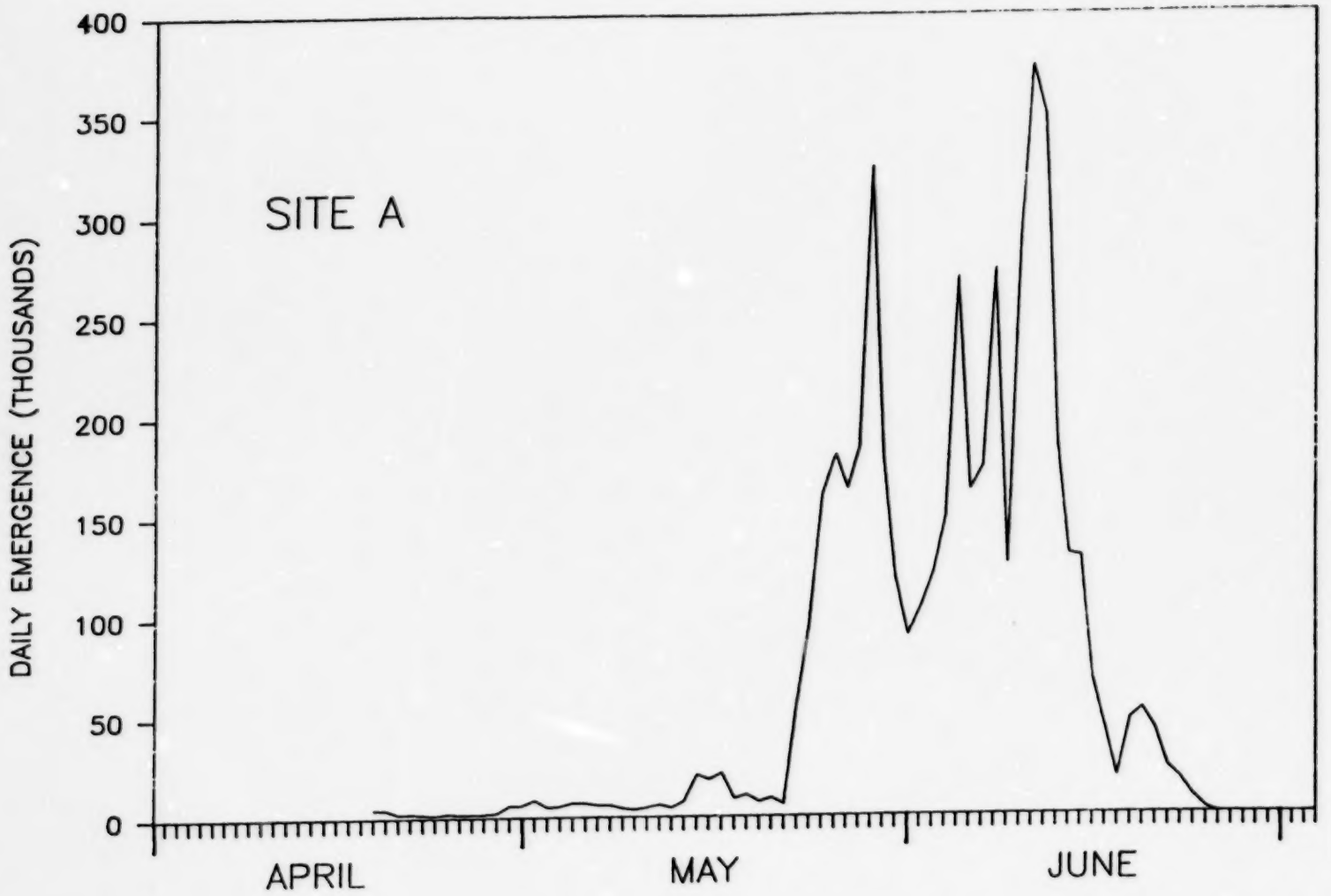

Fig 4. Variation in daily emergence at Site A.

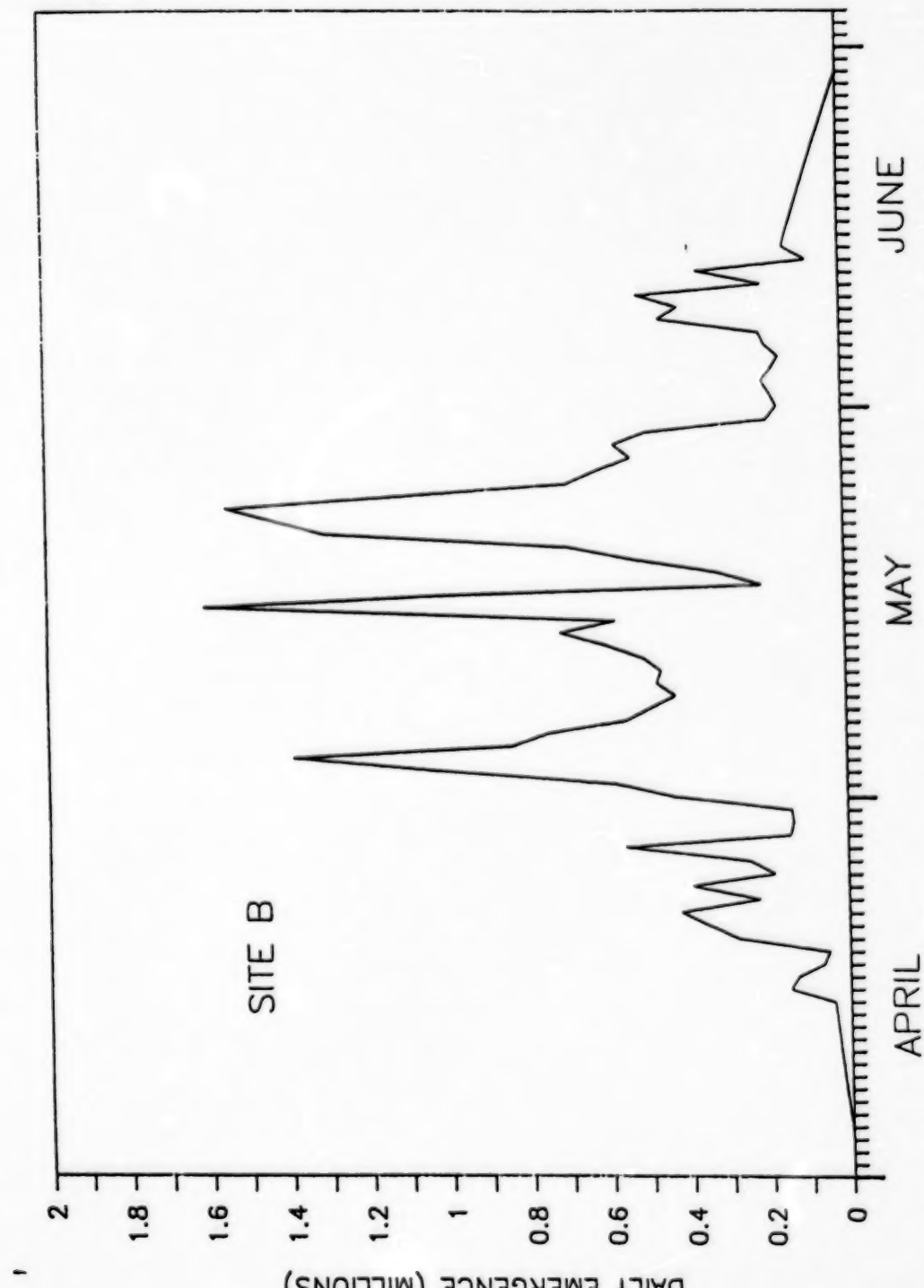

Fig 5. Variation in daily emergence at Site B.

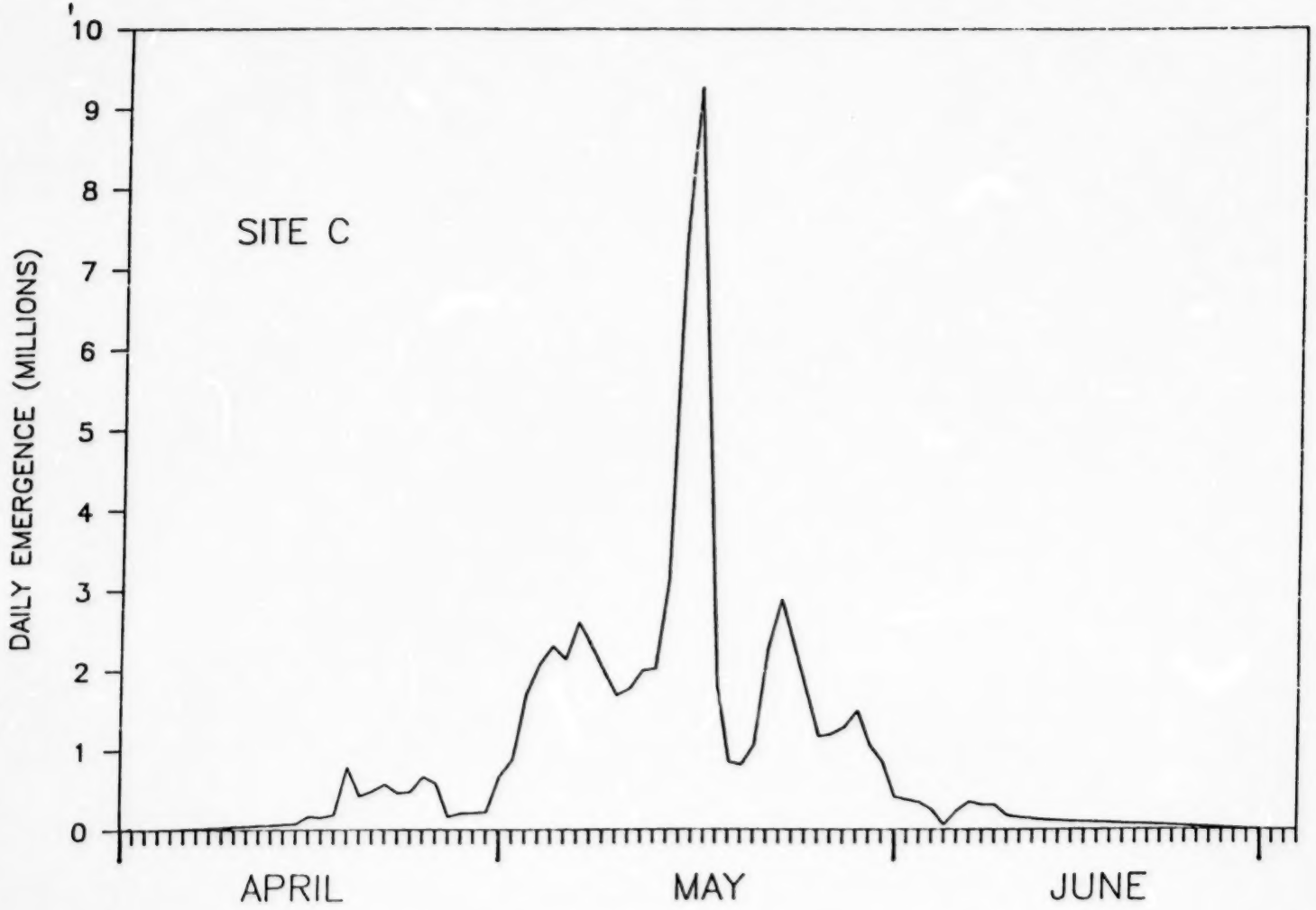

Fig 6. Variation in daily emergence at Site C.

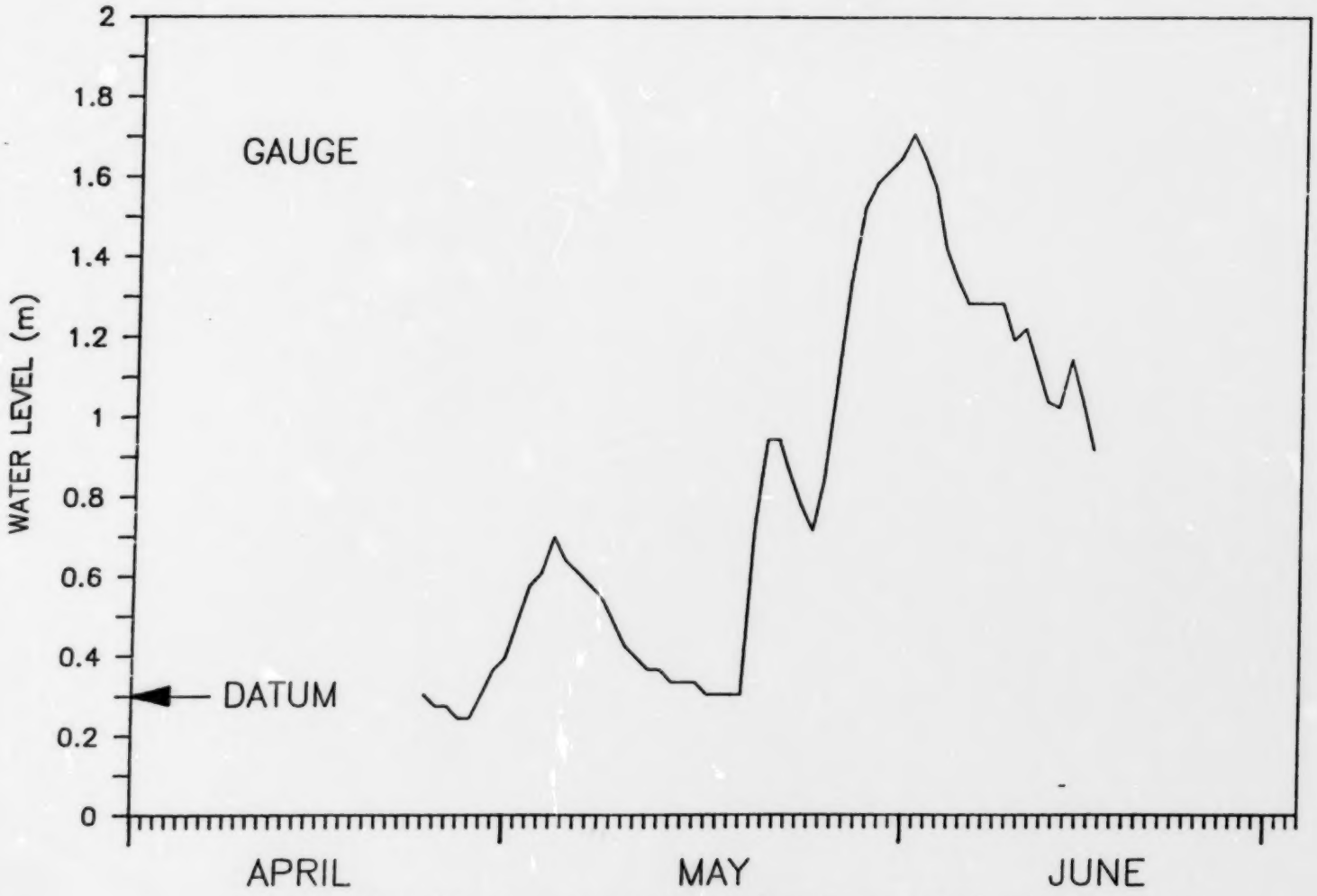

Fig 7. Variation in water level relative to a datum established at 0.3m before any run-off occurred.

Appendix I

Table I: Night catch data for the left trap located at Site B. Miscellaneous catch refers to fish captured but not included in the total weight or subsample because they were tangled in debris that was removed prior to any weights being taken. Refer to text for explanation of calculations.

DATE	TOTAL WEIGHT (g)	SUBSAMPLE (g)	ALL FISH (n)	(n/g)	SOCKEYE (n)	CHINOOK (n)	MISCELLANEOUS CATCH SOCKEYE (n)	MISCELLANEOUS CATCH CHINOOK (n)	ESTIMATED TOTAL CATCH SOCKEYE (n)	ESTIMATED TOTAL CATCH CHINOOK (n)
19-Apr			0	NA			500	1	500	1
20-Apr			0	NA			1,845	7	1,845	7
21-Apr			0	NA			2,030	6	2,030	6
22-Apr			0	NA			815	6	815	6
23-Apr			0	NA			716	6	716	6
24-Apr			0	NA			4,115	13	4,115	13
25-Apr	817	126	727	5.770	727	0	0	7	4,714	7
26-Apr	930	149	950	6.376	950	0	0	1	5,930	1
27-Apr	432	52	220	5.773	220	0	0	2	2,494	2
28-Apr	1,127	117	605	5.171	605	0	0	24	5,828	24
29-Apr	586	71	379	5.338	379	0	0	3	3,128	3
30-Apr	592	44	253	5.737	253	0	0	8	3,396	8
01-May	1,014	114	623	5.489	619	4	0	0	5,530	36
02-May	432	62	356	5.705	356	0	0	9	2,465	9
03-May	405	94	515	5.473	515	0	0	3	2,217	3
04-May	393	82	489	5.934	489	0	0	15	2,332	15
05-May	980	126	689	5.468	687	2	0	2	5,343	18
06-May	815	93	574	6.172	574	0	294	8	5,324	8
07-May	1,415	146	923	6.344	912	11	316	28	9,185	135
08-May	2,075	110	692	6.291	689	3	181	64	13,178	121
09-May	1,458	152	913	6.007	903	10	187	2	8,849	98
10-May	1,263	159	994	6.252	991	3	157	6	8,029	30
11-May	941	175	977	5.583	974	3	68	1	5,305	17
12-May			0	NA					0	0
13-May	720	86	520	6.068	516	4	28	0	4,363	34
14-May	700	79	498	6.304	494	4	80	2	4,457	37
15-May	631	85	533	6.308	533	0	4	0	3,984	0
16-May	763	92	562	6.142	562	0	120	0	4,806	0
17-May	925	95	609	6.424	607	2	45	1	5,968	21
18-May	1,025	128	795	6.196	794	1	30	0	6,373	8
19-May	1,134	128	723	5.635	723	0	52	0	6,442	0
20-May	3,380	387	2,393	6.183	2,390	3	162	0	21,036	26
21-May	1,805	163	1,003	6.172	997	6	194	4	11,268	71
22-May			0	NA			2,740	11	2,740	11
23-May	498	57	297	5.257	297	0	121	6	2,739	6
24-May	620	59	345	5.828	345	0	54	0	3,667	0
25-May	730	111	670	6.020	670	0	56	0	4,450	0
26-May	1,370	179	1,017	5.669	1,017	0	48	0	7,814	0
27-May			0	NA					0	0
28-May	1,202	184	1,083	5.889	1,081	2	60		7,126	13

Appendix I

Table I: Continued.

DATE	TOTAL WEIGHT (g)	SUBSAMPLE (g)	SUBSAMPLE ALL FISH (n)	SUBSAMPLE (n/g)	SUBSAMPLE SOCKEYE (n)	SUBSAMPLE CHINOOK (n)	MISCELLANEOUS CATCH SOCKEYE (n)	MISCELLANEOUS CATCH CHINOOK (n)	ESTIMATED TOTAL CATCH SOCKEYE (n)	ESTIMATED TOTAL CATCH CHINOOK (n)
29-May			0	NA					0	0
30-May	510	78	490	6.323	490	0	12	0	3,237	0
31-May	463	48	296	6.167	296	0	28	0	2,880	0
01-Jun	415	55	330	6.000	330	0	7	0	2,497	0
02-Jun	520	71	390	5.532	390	0	2	0	2,879	0
03-Jun	475	46	270	5.870	270	0	18	0	2,806	0
04-Jun	131	131	738	5.621	738	0	101	0	839	0
05-Jun	103	103	589	5.746	589	0	69	0	658	0
06-Jun			0	NA			761		761	0
07-Jun			0	NA			758		758	0
08-Jun			0	NA			720		720	0
09-Jun			0	NA			633		633	0
10-Jun	96	96	414	4.335	414	0	432	0	846	0
11-Jun			0	NA			652		652	0
12-Jun	182	182	762	4.187	762	0	770	0	1,532	0
13-Jun	389	389	2,009	5.165	2,009	0	0	0	2,009	0
14-Jun	656	70	227	3.266	227	0	0	0	2,143	0
15-Jun			0	NA			459		459	0
16-Jun	437	437	1,816	4.156	1,816	0	0	1	1,816	1
17-Jun			0	NA			313		313	0
18-Jun			0	NA			588		588	0

Appendix I

Table II: Night catch data for the right trap located at Site B. Miscellaneous catch refers to fish captured but not included in the total weight or subsample because they were tangled in debris that was removed prior to any weights being taken. Refer to text for explanation of calculations.

		SUBSAMPLE					MISCELLANEOUS CATCH		ESTIMATED TOTAL CATCH	
DATE	TOTAL WEIGHT (g)	(g)	ALL FISH (n)	(n/g)	SOCKEYE (n)	CHINOOK (n)	SOCKEYE (n)	CHINOOK (n)	SOCKEYE (n)	CHINOOK (n)
19-Apr			0	NA			250	0	250	0
20-Apr			0	NA			865	1	865	1
21-Apr			0	NA			270	1	270	1
22-Apr			0	NA			340	5	340	5
23-Apr			0	NA			198	0	198	0
24-Apr			0	NA			923	7	923	7
25-Apr	300	133	792	5.955	792	0	0	3	1,786	3
26-Apr	384	138	726	5.261	726	0	0	0	2,020	0
27-Apr	330	48	233	5.496	233	0	0	18	1,814	18
28-Apr	345	115	659	5.730	659	0	0	8	1,977	8
29-Apr			0	NA			523	11	523	11
30-Apr	265	33	195	6.000	195	0	0	5	1,590	5
01-May	939	91	543	5.967	539	4	0	0	5,562	41
02-May			0	NA			409	6	409	6
03-May			0	NA			515	0	515	0
04-May			0	NA			515	2	515	2
05-May	616	51	290	5.686	288	2	0	5	3,479	29
06-May	1,080	102	601	5.892	601	0	54	13	6,418	13
07-May	1,804	176	1,083	6.171	1,081	2	276	16	11,388	37
08-May	2,320	109	649	5.954	645	4	466	52	14,194	137
09-May	1,280	126	719	5.720	719	0	43	51	7,365	51
10-May	1,053	132	780	5.932	771	9	91	0	6,265	72
11-May	805	130	812	6.246	808	4	66	1	5,069	26
12-May			0	NA					0	0
13-May	550	105	658	6.267	657	1	17	0	3,458	5
14-May	738	154	891	5.805	884	7	24	0	4,274	34
15-May	790	100	599	6.020	599	0	2	0	4,758	0
16-May	814	116	713	6.131	711	2	76	0	5,052	14
17-May	930	95	606	6.379	604	2	50	0	5,963	20
18-May	1,236	182	1,213	6.676	1,213	0	25	0	8,276	0
19-May	978	112	649	5.779	648	1	22	0	5,665	9
20-May	2,247	269	1,621	6.028	1,617	4	83	1	13,595	34
21-May	1,595	150	870	5.800	852	18	256	6	9,316	197
22-May			0	NA			1,121	4	1,121	4
23-May	508	58	310	5.317	309	1	32	1	2,724	10
24-May	707	110	673	6.107	673	0	97	1	4,415	1
25-May	823	133	798	6.023	798	0	73	0	5,030	0
26-May	1,365	176	1,029	5.860	1,029	0	32	0	8,031	0
27-May			0	NA					0	0
28-May	1,270	128	697	5.437	696	1	53	0	6,948	10

Appendix I

Table II: Continued.

DATE	TOTAL WEIGHT (g)	SUBSAMPLE (g)	ALL FISH (n)	(n/g)	SOCKEYE (n)	CHINOOK (n)	MISCELLANEOUS CATCH SOCKEYE (n)	MISCELLANEOUS CATCH CHINOOK (n)	ESTIMATED TOTAL CATCH SOCKEYE (n)	ESTIMATED TOTAL CATCH CHINOOK (n)
29-May			0	NA					0	0
30-May	490	62	383	6.228	383	0	5	0	3,057	0
31-May	440	50	311	6.220	311	0	0	0	2,737	0
01-Jun	389	46	282	6.198	282	0	0	0	2,411	0
02-Jun	425	45	259	5.820	259	0	43	0	2,517	0
03-Jun	282	38	226	5.947	226	0	0	0	1,677	0
04-Jun	117	117	718	6.137	718	0	74	0	792	0
05-Jun	107	107	610	5.717	610	0	74	0	684	0
06-Jun			0	NA			651		651	0
07-Jun			0	NA			727		727	0
08-Jun			0	NA			569		569	0
09-Jun			0	NA			505		505	0
10-Jun			0	NA			546		546	0
11-Jun			0	NA			825		825	0
12-Jun	207	207	881	4.266	881	0	893	0	1,774	0
13-Jun	196	196	937	4.781	937	0	0	0	937	0
14-Jun	445	97	340	3.505	340	0	0	0	1,558	0
15-Jun			0	NA			953		953	0
16-Jun	212	212	794	3.745	794	0	0	0	794	0
17-Jun			0	NA			284		284	0
18-Jun			0	NA			438		438	0

Appendix I

Table III: Night catch data for the left trap located at Site C. Miscellaneous catch refers to fish captured but not included in the total weight or subsample because they were tangled in debris that was removed prior to any weights being taken. Refer to text for explanation of calculations.

DATE	TOTAL WEIGHT (g)	SUBSAMPLE (g)	SUBSAMPLE ALL FISH (n)	SUBSAMPLE (n/g)	SUBSAMPLE SOCKEYE (n)	SUBSAMPLE CHINOOK (n)	MISCELLANEOUS CATCH SOCKEYE (n)	MISCELLANEOUS CATCH CHINOOK (n)	ESTIMATED TOTAL CATCH SOCKEYE (n)	ESTIMATED TOTAL CATCH CHINOOK (n)
18-Apr			0	NA			652		652	0
19-Apr			0	NA			720		720	0
20-Apr			0	NA			1,970		1,970	0
21-Apr			0	NA			1,975	2	1,975	2
22-Apr			0	NA			2,030	6	2,030	6
23-Apr			0	NA			7,527	10	7,527	10
24-Apr			0	NA			3,523	8	3,523	8
25-Apr			0	NA			5,100	15	5,100	15
26-Apr	714	122.0	664	5.443	664	0	0	5	3,886	5
27-Apr	553	58.0	291	5.017	291	0	0	9	2,775	9
28-Apr	1,144	135.0	772	5.719	772	0	0	6	6,542	6
29-Apr	1,547	172.0	982	5.709	982	0	0	15	8,832	15
30-Apr	662	67.3	324	4.814	324	0	0	17	3,187	17
01-May	441	70.3	408	5.804	406	2	0	0	2,547	13
02-May	567	75.1	433	5.766	433	0	0	16	3,269	16
03-May	571	71.0	376	5.296	376	0	0	6	3,024	6
04-May	460	53.3	346	6.492	346	0	21	11	3,007	11
05-May	1,320	127.5	698	5.475	698	0	166	6	7,392	6
06-May	1,125	110.5	671	6.072	671	0	136	15	6,967	15
07-May	1,890	184.0	1,113	6.049	1,113	0	826	5	12,258	5
08-May	2,478	152.0	954	6.276	951	3	211	25	15,715	74
09-May	2,344	217.3	1,397	6.429	1,392	5	337	2	15,352	56
10-May	2,350	279.0	1,766	6.330	1,760	6	364	1	15,188	52
11-May	2,345	241.0	1,553	6.444	1,551	2	486	1	15,578	20
12-May			0	NA					0	0
13-May	1,810	209.5	1,362	6.501	1,355	7	54	0	11,761	60
14-May	1,512	189.5	1,186	6.259	1,183	3	13	0	9,452	24
15-May	1,530	180.0	1,074	5.967	1,072	2	56	0	9,168	17
16-May	1,321	105.4	656	6.224	654	2	69	0	8,266	25
17-May	480	56.7	352	6.208	351	1	24	0	2,995	8
18-May	2,135	205.5	1,222	5.946	1,222	0	379	0	13,075	0
19-May	7,270	436.5	2,856	6.543	2,856	0	1,401	1	48,968	1
20-May	6,900	406.0	2,479	6.106	2,478	1	1,064	0	43,178	17
21-May			0	NA			1,720		1,720	0
22-May	1,720	167.0	1,057	6.329	1,051	6	45	1	10,870	63
23-May	892	125.8	646	5.135	643	3	106	3	4,665	24
24-May	730	128.4	740	5.763	740	0	20	0	4,227	0
25-May	938	161.7	902	5.578	902	0	14	0	5,246	0
26-May	2,258	352.5	2,136	6.060	2,136	0	106	0	13,789	0
27-May	2,804	283.7	1,727	6.087	1,720	7	859	0	17,859	69

Appendix I

Table III: Continued.

DATE	TOTAL WEIGHT (g)	SUBSAMPLE (g)	ALL FISH (n)	(n/g)	SOCKEYE (n)	CHINOOK (n)	MISCELLANEOUS CATCH SOCKEYE (n)	MISCELLANEOUS CATCH CHINOOK (n)	ESTIMATED TOTAL CATCH SOCKEYE (n)	ESTIMATED TOTAL CATCH CHINOOK (n)
28-May			0	NA					0	0
29-May			0	NA					0	0
30-May	885	100.0	655	6.550	655	0	48	1	5,845	1
31-May	808	90.0	547	6.078	547	0	60	0	4,971	0
01-Jun	732	120.0	729	6.075	729	0	70	0	4,517	0
02-Jun	627	85.2	512	6.009	512	0	49	0	3,817	0
03-Jun	780	95.0	533	5.611	533	0	97	0	4,473	0
04-Jun	550	51.5	320	6.214	320	0	84	0	3,501	0
05-Jun	307	33.0	190	5.758	190	0	8	0	1,773	0
06-Jun	261	29.8	155	5.201	155	0	5	0	1,363	0
07-Jun	277	31.0	143	4.613	143	0	0	0	1,278	0
08-Jun			0	NA			999		999	0
09-Jun			0	NA			162		162	0
10-Jun			0	NA			679		679	0
11-Jun			0	NA			1,353		1,353	0
12-Jun	214	213.7	1,081	5.058	1,081	0	0	0	1,081	0
13-Jun	204	203.5	1,111	5.459	1,111	0	0	0	1,111	0
14-Jun	152	151.5	643	4.244	643	0	0	0	643	0
15-Jun			0	NA			618		618	0
16-Jun			0	NA			560		560	0
17-Jun			0	NA			364		364	0

Appendix I

Table IV: Night catch data for the right trap located at Site C. Miscellaneous catch refers to fish captured but not included in the total weight or subsample because they were tangled in debris that was removed prior to any weights being taken. Refer to text for explanation of calculations.

DATE	TOTAL WEIGHT (g)	SUBSAMPLE (g)	ALL FISH (n)	(n/g)	SOCKEYE (n)	CHINOOK (n)	MISCELLANEOUS CATCH SOCKEYE (n)	MISCELLANEOUS CATCH CHINOOK (n)	ESTIMATED TOTAL CATCH SOCKEYE (n)	ESTIMATED TOTAL CATCH CHINOOK (n)
18-Apr			0	NA			485		485	0
19-Apr			0	NA			510		510	0
20-Apr			0	NA			800		800	0
21-Apr			0	NA			473	8	473	8
22-Apr			0	NA			1,060	2	1,060	2
23-Apr			0	NA			5,124	7	5,124	7
24-Apr			0	NA			3,124	12	3,124	12
25-Apr			0	NA			2,692	7	2,692	7
26-Apr	925	226.0	1,336	5.912	1,336	0	0	4	5,468	4
27-Apr	990	110.0	539	4.900	539	0	0	1	4,851	1
28-Apr	274	15.0	87	5.800	87	0	0	5	1,589	5
29-Apr	524	73.0	391	5.356	391	0	0	4	2,807	4
30-Apr	1,310	171.5	920	5.364	920	0	0	8	7,027	8
01-May			0	NA			323	0	323	0
02-May			0	NA			522	12	522	12
03-May			0	NA			796	2	796	2
04-May	163	17.3	108	6.243	108	0	44	2	1,062	2
05-May	908	144.0	760	5.278	760	0	0	0	4,792	0
06-May	1,452	136.5	837	6.132	837	0	256	27	9,159	27
07-May	2,840	243.5	1,567	6.435	1,564	3	414	7	18,655	42
08-May	3,390	268.5	1,698	6.324	1,694	4	538	30	21,926	81
09-May	3,823	381.5	2,467	6.467	2,464	3	594	0	25,286	30
10-May	3,386	276.5	1,755	6.347	1,752	3	62	0	21,517	37
11-May	4,150	425.0	2,852	6.711	2,845	7	322	0	28,103	68
12-May			0	NA					0	0
13-May	2,950	277.5	1,824	6.573	1,817	7	490	0	19,806	74
14-May	2,625	332.0	2,106	6.343	2,102	4	17	0	16,637	32
15-May	2,720	268.0	1,725	6.437	1,722	3	28	0	17,505	30
16-May	3,374	326.0	2,164	6.638	2,161	3	53	0	22,419	31
17-May	4,215	369.5	2,496	6.755	2,495	1	16	0	28,477	11
18-May	5,553	643.0	4,167	6.481	4,167	0	529	0	36,516	0
19-May	11,160	729.0	4,410	6.049	4,408	2	826	0	68,306	31
20-May	14,391	1052.0	6,939	6.596	6,936	3	1,349	1	96,231	42
21-May			0	NA					0	0
22-May	1,930	182.0	1,159	6.368	1,154	5	65	1	12,302	54
23-May	951	135.2	771	5.703	771	0	137	0	5,560	0
24-May	822	143.3	831	5.799	831	0	24	0	4,791	0
25-May	927	126.0	747	5.929	747	0	22	0	5,518	0
26-May	1,125	116.2	706	6.076	705	1	169	1	6,995	11
27-May	1,152	123.5	677	5.482	674	3	701	0	6,988	28

Appendix I

Table IV: Continued.

DATE	TOTAL WEIGHT (g)	SUBSAMPLE (g)	ALL FISH (n)	(n/g)	SOCKEYE (n)	CHINOOK (n)	MISCELLANEOUS CATCH SOCKEYE (n)	CHINOOK (n)	ESTIMATED TOTAL CATCH SOCKEYE (n)	CHINOOK (n)
28-May	1,552	325.4	1,832	5.630	1,830	2	1,614	0	10,342	10
29-May	206	205.7	1,034	5.027	1,032	2	217	0	1,249	2
30-May	420	45.0	267	5.933	267	0	8	0	2,500	0
31-May	632	65.0	385	5.923	385	0	225	0	3,968	0
01-Jun	845	100.5	596	5.930	596	0	428	0	5,439	0
02-Jun	1,360	120.0	710	5.917	710	0	74	0	8,121	0
03-Jun	680	76.5	427	5.582	427	0	146	0	3,942	0
04-Jun	554	70.0	394	5.629	394	0	50	0	3,168	0
05-Jun	253	32.5	178	5.477	178	0	2	1	1,388	1
06-Jun	295	34.0	174	5.118	174	0	7	0	1,517	0
07-Jun	271	45.0	215	4.778	215	0	0	0	1,292	0
08-Jun			0	NA			893		893	0
09-Jun			0	NA			238	1	238	1
10-Jun			0	NA			1,097		1,097	0
11-Jun			0	NA			1,271		1,271	0
12-Jun	217	217.0	1,167	5.378	1,167	0	1	0	1,168	0
13-Jun	228	228.0	1,142	5.009	1,142	0	0	0	1,142	0
14-Jun	139	138.5	627	4.527	627	0	0	0	627	0
15-Jun			0	NA			509		509	0
16-Jun			0	NA			434		434	0
17-Jun			0	NA			490		490	0

Appendix II

Table I: Trap catches and estimated emergence for Site A. As this is above the Horsefly Falls only sockeye fry were caught. When marks were not released proportions are linearly interpolated between estimates. Daily emergence estimates are linearly interpolated when traps removed due to high water or debris, and from trap removal to final emergence. Refer to text for explanation of methods and calculations.

	CATCH			MARKS		ESTIMATED DAILY EMERGENCE
DATE	LEFT (n)	RIGHT (n)	TOTAL (n)	RELEASED (n)	RECOVERED (%)	(n)
23-Apr	24	48	72		1.510	4,768
24-Apr	30	35	65		1.510	4,304
25-Apr	9	22	31		1.510	2,053
26-Apr	16	23	39		1.510	2,583
27-Apr	6	21	27		1.510	1,788
28-Apr	3	16	19		1.510	1,258
29-Apr	12	27	39		1.510	2,583
30-Apr	11	17	28		1.510	1,854
01-May	6	21	27		1.510	1,788
02-May	9	20	29	11,787	1.510	1,920
03-May	6	33	39		1.474	2,645
04-May	30	65	95		1.438	6,605
05-May	24	63	87		1.402	6,203
06-May	31	92	123		1.367	9,000
07-May	18	49	67		1.331	5,035
08-May	24	51	75		1.295	5,792
09-May	22	75	97	25,815	1.259	7,705
10-May	34	62	96		1.326	7,240
11-May	23	63	86		1.393	6,174
12-May	31	58	89		1.460	6,096
13-May	22	42	64		1.527	4,191
14-May	19	38	57		1.594	3,576
15-May	17	64	81	16,374	1.661	4,876
16-May	26	81	107		1.653	6,473
17-May	19	56	75		1.645	4,559
18-May	46	85	131		1.637	8,003
19-May	145	200	345		1.629	21,183
20-May	121	176	297	12,033	1.621	18,327
21-May	130	225	355		1.612	22,021
22-May	59	81	140		1.604	8,730
23-May	65	112	177		1.595	11,096
24-May	48	65	113	5,294	1.587	7,122
25-May	52	86	138		1.457	9,469
26-May	21	56	77		1.328	5,797
27-May	0	0	0		1.199	57,739
28-May	0	0	0		1.070	98,483
29-May	895	625	1,520		0.940	161,623
30-May	826	642	1,468	6,780	0.811	180,964
31-May	610	830	1,440		0.882	163,288

Appendix II

Table I: Continued.

DATE	CATCH LEFT (n)	CATCH RIGHT (n)	CATCH TOTAL (n)	MARKS RELEASED (n)	MARKS RECOVERED (%)	ESTIMATED DAILY EMERGENCE (n)
01-Jun	1,006	754	1,760		0.953	184,769
02-Jun	2,241	1,075	3,316	4,007	1.023	324,078
03-Jun	1,181	563	1,744		0.976	178,742
04-Jun	737	352	1,089		0.928	117,322
05-Jun	522	270	792		0.881	89,927
06-Jun	611	252	863		0.833	103,575
07-Jun	605	344	949	4,200	0.786	120,782
08-Jun	423	737	1,160		0.775	149,696
09-Jun	1,248	806	2,054		0.764	268,816
10-Jun	773	449	1,222		0.753	162,224
11-Jun	830	465	1,295		0.742	174,418
12-Jun	1,320	673	1,993		0.732	272,396
13-Jun	637	265	902		0.721	125,131
14-Jun	1,345	715	2,060		0.710	290,128
15-Jun	1,535	1,080	2,615		0.699	373,988
16-Jun	1,605	795	2,400		0.688	348,630
17-Jun	855	401	1,256		0.678	185,361
18-Jun	600	264	864		0.667	129,577
19-Jun	600	243	843		0.656	128,511
20-Jun	305	124	429	3,100	0.645	66,495
21-Jun	195	84	279		0.645	43,245
22-Jun	77	41	118		0.645	18,290
23-Jun	201	105	306		0.645	47,430
24-Jun	258	81	339		0.645	52,545
25-Jun	190	80	270		0.645	41,850
26-Jun	118	32	150		0.645	23,250
27-Jun	36	75	111		0.645	17,205
28-Jun	0	0	0			8,603
29-Jun	0	0	0			2,151
30-Jun	0	0	0			0
TOTALS	23,544	15,450	38,994	89,390		4,934,050

Appendix II

Table II: Estimated emergence for Site B. Day catch is the total of both sockeye and chinook fry captured. When the traps were not fished during the day or marks not released proportions are linearly interpolated between estimates. Night emergence estimates are linearly interpolated from first emergence to trap installation, when traps removed due to high water or debris, and from trap removal to final emergence. Refer to text for explanation of calculations.

	CATCH ESTIMATES				MARKS		ESTIMATED EMERGENCE			
DATE	NIGHT SOCKEYE (n)	NIGHT CHINOOK (n)	DAY TOTAL (n)	ESTIMATED NIGHT PROPORTION (%)	RELEASED (n)	RECOVERED (%)	NIGHT SOCKEYE (n)	24 HOUR SOCKEYE (n)	NIGHT CHINOOK (n)	24 HOUR CHINOOK (n)
08-Apr							0	0	0	0
09-Apr							3,791	3,820	37	37
10-Apr							7,581	7,639	74	74
11-Apr							11,372	11,459	110	111
12-Apr							15,163	15,278	147	148
13-Apr							18,954	19,098	184	185
14-Apr							22,744	22,917	221	223
15-Apr							26,535	26,737	257	260
16-Apr							30,326	30,556	294	297
17-Apr							34,117	34,376	331	334
18-Apr							37,907	38,195	368	371
19-Apr	750	1		99.25		1.799	41,698	42,015	405	408
20-Apr	2,710	8		99.25		1.799	150,668	151,813	445	448
21-Apr	2,300	7		99.25		1.799	127,873	128,845	389	392
22-Apr	1,155	11		99.25		1.799	64,215	64,703	612	617
23-Apr	914	6		99.25		1.799	50,816	51,202	862	869
24-Apr	5,038	20		99.25	11,175	1.799	280,098	282,227	1,112	1,120
25-Apr	6,500	10		99.25		1.843	352,627	355,307	543	547
26-Apr	7,950	1		99.25		1.888	421,090	424,291	789	795
27-Apr	4,308	20		99.25		1.933	222,911	224,605	1,035	1,043
28-Apr	7,805	32		99.25	21,899	1.977	394,738	397,738	1,618	1,630
29-Apr	3,651	14		99.25		1.985	183,934	185,332	705	710
30-Apr	4,986	13	38	99.25		1.993	250,221	252,123	652	657
01-May	11,092	77		99.12		2.000	554,510	559,454	3,849	3,883
02-May	2,874	15		98.99	24,722	2.008	143,126	144,591	747	755
03-May	2,732	3		98.86		2.016	135,536	137,102	794	803
04-May	2,847	17		98.73		2.023	140,704	142,516	840	851
05-May	8,822	47		98.60		2.031	434,350	440,520	2,314	2,347
06-May	11,742	21		98.47	27,909	2.039	575,936	584,884	1,030	1,046
07-May	20,573	172	350	98.34		2.034	1,011,471	1,028,536	8,456	8,599
08-May	27,372	258		97.09		2.029	1,348,928	1,389,315	12,715	13,096
09-May	16,214	149		95.85		2.024	800,942	835,661	7,360	7,679
10-May	14,294	102		94.60		2.020	707,776	748,197	5,051	5,339
11-May	10,374	43		93.35		2.015	514,899	551,580	2,134	2,286
12-May	0	0		92.10		2.010	452,471	491,272	2,040	2,215
13-May	7,821	39		90.85	30,222	2.005	390,043	429,306	1,945	2,141
14-May	8,731	71	1,021	89.61		2.047	426,565	476,043	3,469	3,871
15-May	8,742	0		90.30		2.088	418,584	463,558	2,942	3,258

Appendix II

Table II: Continued.

	CATCH ESTIMATES				MARKS		ESTIMATED EMERGENCE			
DATE	NIGHT SOCKEYE (n)	CHINOOK (n)	DAY TOTAL (n)	ESTIMATED NIGHT PROPORTION (%)	RELEASED (n)	RECOVERED (%)	NIGHT SOCKEYE (n)	24 HOUR SOCKEYE (n)	NIGHT CHINOOK (n)	24 HOUR CHINOOK (n)
16-May	9,858	14		90.99		2.130	462,790	508,617	2,415	2,654
17-May	11,931	41		91.68		2.172	549,366	599,211	1,888	2,059
18-May	14,649	8		92.37		2.213	661,824	716,468	2,129	2,305
19-May	12,107	9		93.06		2.255	536,876	576,884	2,371	2,548
20-May	34,631	60		93.76	46,762	2.297	1,507,835	1,608,245	2,612	2,786
21-May	20,584	268		94.45		2.124	969,029	1,025,990	12,617	13,359
22-May	3,861	15	198	95.14		1.952	197,834	207,940	769	808
23-May	5,463	16		95.08		1.779	307,067	322,947	899	945
24-May	8,082	1		95.03		1.607	503,068	529,402	1,199	1,262
25-May	9,480	0		94.97	16,597	1.434	661,091	696,116	1,500	1,579
26-May	15,845	0		94.91		1.275	1,242,483	1,309,097	1,800	1,897
27-May	0	0		94.85		1.117	1,355,933	1,429,489	2,101	2,215
28-May	14,074	23		94.80	15,765	0.958	1,469,382	1,550,026	2,401	2,533
29-May	0	0		94.74		0.959	1,062,504	1,121,493	2,332	2,461
30-May	6,294	0		94.68	10,000	0.960	655,625	692,442	2,264	2,391
31-May	5,617	0	319	94.63		0.961	584,664	617,869	2,195	2,320
01-Jun	4,908	0		96.06		0.961	510,481	531,436	2,127	2,214
02-Jun	5,396	0		97.49	9,146	0.962	560,816	575,267	2,058	2,111
03-Jun	4,483	0	49	98.92		0.924	485,137	490,439	1,989	2,011
04-Jun	1,631	0		98.28		0.886	184,092	187,321	1,921	1,955
05-Jun	1,342	0		97.63		0.848	158,279	162,115	1,852	1,897
06-Jun	1,412	0		96.99		0.810	174,370	179,780	1,784	1,839
07-Jun	1,485	0		96.35	13,866	0.772	192,439	199,733	1,715	1,780
08-Jun	1,289	0		95.71		0.772	167,040	174,535	1,646	1,720
09-Jun	1,138	0		95.06		0.772	147,472	155,131	1,578	1,660
10-Jun	1,392	0		94.42		0.772	180,388	191,048	1,509	1,598
11-Jun	1,477	0	98	93.78		0.772	191,403	204,103	1,441	1,537
12-Jun	3,306	0		93.78		0.772	428,421	456,847	1,372	1,463
13-Jun	2,946	0		93.78		0.772	381,769	407,100	1,303	1,389
14-Jun	3,701	0		93.78		0.772	479,608	511,430	1,235	1,317
15-Jun	1,412	0		93.78		0.772	182,979	195,120	1,166	1,243
16-Jun	2,610	1		93.78		0.772	338,227	360,669	1,098	1,171
17-Jun	597	0		93.78		0.772	77,365	82,498	1,029	1,097
18-Jun	1,026	0		93.78		0.772	132,958	141,780	960	1,024
19-Jun							123,461	131,653	891	951
20-Jun							113,964	121,526	823	878
21-Jun							104,467	111,399	754	805
22-Jun							94,970	101,272	686	732
23-Jun							85,473	91,144	617	659
24-Jun							75,976	81,017	548	585
25-Jun							66,479	70,890	480	512
26-Jun							56,982	60,763	411	439

Appendix II

Table II: Continued.

DATE	CATCH ESTIMATES NIGHT SOCKEYE (n)	CHINOOK (n)	DAY TOTAL (n)	ESTIMATED NIGHT PROPORTION (%)	MARKS RELEASED (n)	RECOVERED (%)	ESTIMATED EMERGENCE NIGHT SOCKEYE (n)	24 HOUR SOCKEYE (n)	NIGHT CHINOOK (n)	24 HOUR CHINOOK (n)
27-Jun							47,485	50,636	343	366
28-Jun							37,988	40,509	274	293
29-Jun							28,491	30,381	205	219
30-Jun							18,994	20,254	137	147
01-Jul							9,497	10,127	68	73
02-Jul							0	0	0	0
TOTALS	416,324	1,613	2,073		228,063		29,370,062	30,832,968	142,393	149,250

Appendix II

Table III: Estimated emergence for Site C. Day catch is the total of both sockeye and chinook fry captured. When the traps were not fished during the day or marks not released proportions are linearly interpolated between estimates. Night emergence estimates are linearly interpolated from first emergence to trap installation, when traps removed due to high water or debris, and from trap removal to final emergence. Refer to text for explanation of calculations.

	CATCH ESTIMATES				MARKS		ESTIMATED EMERGENCE			
DATE	NIGHT SOCKEYE (n)	NIGHT CHINOOK (n)	DAY TOTAL (n)	ESTIMATED NIGHT PROPORTION (%)	RELEASED (n)	RECOVERED (%)	NIGHT SOCKEYE (n)	24 HOUR SOCKEYE (n)	NIGHT CHINOOK (n)	24 HOUR CHINOOK (n)
08-Apr							0	0	0	0
09-Apr							7,002	7,072	46	47
10-Apr							14,004	14,143	92	93
11-Apr							21,006	21,215	139	140
12-Apr							28,008	28,286	185	187
13-Apr							35,010	35,358	231	234
14-Apr							42,011	42,430	277	280
15-Apr							49,013	49,501	323	327
16-Apr							56,015	56,573	370	374
17-Apr							63,017	63,644	416	420
18-Apr	1,137	0		99.01		1.624	70,019	70,716	462	467
19-Apr	1,230	0		99.01		1.624	75,746	76,501	513	518
20-Apr	2,770	0		99.01		1.624	170,582	172,281	565	571
21-Apr	2,448	10		99.01		1.624	150,752	152,254	616	622
22-Apr	3,090	8		99.01		1.624	190,288	192,184	493	498
23-Apr	12,651	17		99.01		1.624	779,072	786,833	1,047	1,057
24-Apr	6,647	20		99.01		1.624	409,334	413,412	1,232	1,244
25-Apr	7,792	22		99.01	6,774	1.624	479,846	484,626	1,355	1,368
26-Apr	9,354	9		99.01		1.656	564,835	570,462	543	548
27-Apr	7,626	10		99.01		1.688	451,707	456,207	592	598
28-Apr	8,131	11		99.01		1.720	472,605	477,313	639	645
29-Apr	11,639	19		99.01		1.753	664,074	670,689	1,084	1,095
30-Apr	10,214	25	102	99.01		1.785	572,255	577,956	1,401	1,415
01-May	2,870	13		99.07	24,545	1.817	157,947	159,435	715	722
02-May	3,791	28		99.12		1.818	208,473	210,323	1,540	1,554
03-May	3,820	8		99.17		1.820	209,908	211,657	440	444
04-May	4,069	13		99.23		1.821	223,420	225,161	714	720
05-May	12,184	6		99.28		1.823	668,487	673,333	329	331
06-May	16,126	42		99.33	22,149	1.824	884,096	890,028	2,303	2,318
07-May	30,913	47	191	99.39		1.818	1,700,325	1,710,814	2,585	2,601
08-May	37,641	155		99.36	38,684	1.812	2,077,182	2,090,605	8,554	8,609
09-May	40,638	86		99.33		1.769	2,296,860	2,312,376	4,861	4,894
10-May	36,705	89		99.30		1.726	2,126,038	2,141,024	5,155	5,191
11-May	43,681	88		99.27		1.684	2,594,474	2,613,523	5,227	5,265
12-May	0	0		99.24		1.641	2,284,972	2,302,419	6,806	6,858
13-May	31,567	134		99.21		1.598	1,975,470	1,991,135	8,386	8,452
14-May	26,089	56	215	99.18		1.555	1,677,625	1,691,421	3,601	3,631
15-May	26,673	47		99.04	30,087	1.512	1,763,759	1,780,798	3,108	3,138

Appendix II

Table III: Continued.

	CATCH ESTIMATES				MARKS		ESTIMATED EMERGENCE			
DATE	NIGHT SOCKEYE (n)	CHINOOK (n)	DAY TOTAL (n)	ESTIMATED NIGHT PROPORTION (%)	RELEASED (n)	RECOVERED (%)	NIGHT SOCKEYE (n)	24 HOUR SOCKEYE (n)	NIGHT CHINOOK (n)	24 HOUR CHINOOK (n)
16-May	30,685	56		98.90		1.541	1,990,731	2,012,833	3,633	3,673
17-May	31,472	19		98.76		1.571	2,003,940	2,029,085	1,210	1,225
18-May	49,591	0		98.62		1.600	3,100,177	3,143,571	1,587	1,609
19-May	117,274	32		98.48	24,559	1.629	7,200,330	7,311,584	1,965	1,995
20-May	139,409	59		98.34		1.528	9,122,156	9,276,404	3,861	3,926
21-May	1,720	0		98.20		1.428	5,433,993	5,533,823	6,338	6,454
22-May	23,172	117	462	98.05	27,042	1.327	1,745,830	1,780,463	8,815	8,990
23-May	10,225	24		98.05		1.227	833,475	850,078	1,956	1,995
24-May	9,018	0		98.04		1.126	800,670	816,686	1,700	1,734
25-May	10,764	0		98.03		1.026	1,049,304	1,070,381	1,445	1,474
26-May	20,784	11		98.02	33,069	0.925	2,246,098	2,291,400	1,189	1,213
27-May	24,847	97		98.02		0.877	2,834,786	2,892,196	11,067	11,291
28-May	10,342	10		98.01	38,752	0.828	2,270,908	2,317,086	7,423	7,574
29-May	1,249	2		98.00		0.779	1,707,029	1,741,883	3,780	3,857
30-May	8,345	1		97.99	20,000	0.730	1,143,151	1,166,586	137	140
31-May	8,939	0	184	97.98		0.757	1,180,492	1,204,791	135	138
01-Jun	9,956	0		98.10		0.784	1,269,165	1,293,767	133	136
02-Jun	11,938	0		98.21	18,357	0.812	1,470,778	1,497,528	131	133
03-Jun	8,415	0	143	98.33		0.806	1,044,133	1,061,877	130	132
04-Jun	6,669	0		97.71		0.800	833,433	852,998	128	131
05-Jun	3,161	1		97.08		0.794	397,892	409,845	126	130
06-Jun	2,880	0		96.46		0.789	365,163	378,560	126	131
07-Jun	2,570	0		95.84	15,710	0.783	328,250	342,504	127	133
08-Jun	1,892	0		95.22		0.783	241,653	253,796	127	133
09-Jun	400	1		94.59		0.783	51,089	54,009	128	135
10-Jun	1,776	0		93.97		0.783	226,837	241,392	123	131
11-Jun	2,624	0	187	93.35		0.783	335,147	359,031	118	126
12-Jun	2,249	0		93.35		0.783	287,250	307,721	112	120
13-Jun	2,253	0		93.35		0.783	287,761	308,268	107	115
14-Jun	1,270	0		93.35		0.783	162,209	173,769	102	109
15-Jun	1,127	0		93.35		0.783	143,944	154,202	97	104
16-Jun	994	0		93.35		0.783	126,957	136,005	92	99
17-Jun	854	0		93.35		0.783	109,076	116,849	87	93
18-Jun							102,660	109,976	82	88
19-Jun							96,244	103,102	77	82
20-Jun							89,827	96,229	72	77
21-Jun							83,411	89,355	67	71
22-Jun							76,995	82,482	61	66
23-Jun							70,579	75,608	56	60
24-Jun							64,162	68,735	51	55
25-Jun							57,746	61,861	46	49
26-Jun							51,330	54,988	41	44

Appendix II

Table III: Continued.

	CATCH ESTIMATES				MARKS		ESTIMATED EMERGENCE			
DATE	NIGHT SOCKEYE (n)	CHINOOK (n)	DAY TOTAL (n)	ESTIMATED NIGHT PROPORTION (%)	RELEASED (n)	RECOVERED (%)	NIGHT SOCKEYE (n)	24 HOUR SOCKEYE (n)	NIGHT CHINOOK (n)	24 HOUR CHINOOK (n)
27-Jun							44,914	48,114	36	38
28-Jun							38,497	41,241	31	33
29-Jun							32,081	34,367	26	27
30-Jun							25,665	27,494	20	22
01-Jul							19,249	20,620	15	16
02-Jul							12,832	13,747	10	11
03-Jul							6,416	6,873	5	5
04-Jul							0	0	0	0
TOTALS	960,360	1,393	1,484		299,728		79,431,652	80,739,471	125,644	127,365